АКАДЕМИЈА НАУКА И УМЈЕТНОСТИ
РЕПУБЛИКЕ СРПСКЕ

ACADEMY OF SCIENCES AND
ARTS OF THE REPUBLIC OF СРПСКА

САВРЕМЕНИ МАТЕРИЈАЛИ 2010

КЊИГА АПСТРАКАТА

CONTEMPORARY MATERIALS 2010

THE BOOK OF ABSTRACTS

Бања Лука, 2. и 3. јули 2010. године
Banja Luka, July 2 and 3, 2010

Међународни научни скуп "Савремени материјали 2010" Бања Лука, 2. и 3. јули 2010.
International Scientific Conference "Contemporary materials 2010" Banja Luka, July 2 and 3, 2010

CHARACTERIZATION OF ULTRA THIN DIAMOND LIKE CARBON FILMS

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Nano sized diamond like carbon (DLC) films doped with nitrogen and hydrogen are materials of choice as a mechanical and corrosion protection barrier for the magnetic layer of the computer hard disks. Overall thickness of a-C:N/a-C:H layer is bellow 2 nm and is usually accompanied by 0.5 nm thin flash layer of Cr. To obtain dense and void-free DLC films different plasma and ion beam sources operated with hydrocarbon gases are now replacing sputtering deposition techniques. For the film characterization non-destructive optical techniques like micro-Raman spectroscopy and optical surface analysis are mainly used. For the corrosion protection evaluation different electrochemical and business environmental tests are common while for the revealing of the cobalt migration from magnetic layer the capabilities of Rutherford back-scattering spectroscopy have been demonstrated. Incorporation of tribology layer into the magnetic layer, oxide, carbide or nitride based, and improvement of lubricant properties are the main developmental area in modern hard disk drive structures.

Key words: diamond like carbon, nanohardness, corrosion protection, micro Raman